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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/955,672 | 09/19/2001 | Kevin M. Moore | ADM-0003-00 | 1250 |
| 7590 | 04/20/2004 | | EXAMINER | |
| Michael E. Yates Archer Daniels Midland Company 4666 East Faries Parkway Decatur, IL 62526 | | | OH, TAYLOR V | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1625 | |

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/955,672

Applicant(s)

MOORE ET AL.

Examiner

Taylor Victor Oh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-13 and 16-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6-13 and 16-62 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

The finality of the previous Office Action has been withdrawn. The application is reopened for its prosecution due to a new ground of rejection.

The Status of Claims

Claims 1, 4-13,16-62 are pending.

Claims 1, 4, 6-13,16-62 have been rejected.

Claims 5, 13, 16, 18, 59 have been objected.

Claim Objections

Claims 13, 16, 18, 59 are objected to because of the following informalities:

In claim 13, the phrase "an anhydrosugar alcohol; without using organic solvents," is recited. The semicolon between "alcohol" and "without" is improper. The examiner recommends to change it to a comma. An appropriate correction is required.

In claims 16 and 18, the phrase "the process of claim 58" is recited. Claims 16 and 18 have been written as improper dependent claims. The examiner recommends them to amend the claims to place the claims in proper dependent form. An appropriate correction is required.

In claim 59, there is no period after the end of the claim. Therefore, an appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 33 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "a slurry-like consistency" is recited. The expression of the word "like" is vague and indefinite because the phrase "a slurry-like consistency" does not define exactly what the condition of the isosorbide solution is. Therefore, an appropriate correction is required.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 4, 6-13, and 16-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann (U.S. 3,160,641) in view of Feldmann et al (U.S. 4,564,692).

Hartmann discloses a process of preparing isosorbide by the acid catalyzed dehydration product of sorbitol in the presence of an acid dehydration catalyst, such as sulfuric acid (see col. 1, lines 9-14) at a temperature of from 75 to 124⁰ C (see col. 2, line 50), and then distilling the reaction mixture to recover isosorbide at low pressures of from 0.3 (see col. 2, line 48) to 1 mmHg (see col. 3, line 43) at a temperature of from 124 to 150⁰ C (see col. 2, line 50).

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The instant invention differs from Hartmann in that centrifuging or filtering the anhydrosugar alcohol is unspecified; the vacuum distillation is conducted at a temperature of from 160 to 170⁰ C, and centrifuging the anhydrosugar alcohol are unspecified; the acidic ion exchange resin is added in an amount of from 0.01 to 0.15 gram equivalents to sugar alcohol; the period is from 30 to 45 minutes during the cooling .

Feldmann et al teaches a process of purifying the anhydro sugar alcohols by crystallization from a concentrated solution (see col. 1 ,lines 6-10) in the absence of organic crystallization solvents (see col. 1 ,lines 65-67). Furthermore, all aqueous anhydro sugar alcohol solutions with a suitable concentration have been obtained from acid-catalyzed dehydration of hexitols (see col. 4 ,lines 9-11) with strongly acidic cationic exchange resins (see col. 4 ,lines 60-61); the crystalline anhydro sugar alcohols can be separated from the mixture by centrifugation or filtration (see col. 4 ,lines 25-27). In addition, if the heavy liquors contain two or more different anhydro sugar alcohols, it is possible to use fractional crystallization in succession in order to produce the pure crystalline form (see col. 4 ,lines 35-39); also, it is advisable to conduct the crystallization process at a temperature of from 20 to 65⁰ C. (see col. 3 ,lines 18-19).

With respect to the vacuum distillation conducted at a temperature of from 160 to 170⁰ C, Hartmann does disclose that , during the process of preparing isosorbide, the vacuum distillation is conducted at a temperature of from 124 to 150⁰ C . The claimed ranges and priorart do not overlap but are close enough that one skilled in the

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art would have expected them to have a similar reaction condition in the absence of a unexpected result. Therefore, it would have been obvious to the skilled artisan in the art to have done a routine experiment on its temperature range in order to optimize the claimed process.

Concerning the addition of the amount of from 0.01 to 0.15 gram equivalents of resin to sugar alcohol and the cooling period from 30 to 45 minutes, the limitation of a process with respect to ranges of pH, ratio and period does not impart patentability to a process when such values are those which would be determined by one of ordinary skill in the art in achieving optimum operation of the process. Ratio and period are well understood by those of ordinary skill in the art to be result-effective variables, especially when attempting to control selectivity of a chemical process in the absence of an unexpected result.

Hartmann discloses a process of preparing isosorbide by the acid catalyzed dehydration product of sorbitol in the presence of an acid dehydration catalyst, such as sulfuric acid at a temperature of from 75 to 124⁰ C, and then distilling the reaction mixture to recover isosorbide at low pressures. Also, Feldmann et al expressly teaches the process of purifying the anhydro sugar alcohols obtained from acid-catalyzed dehydration of hexitols by crystallization from a concentrated solution in the absence of organic crystallization solvents; moreover, when sugar alcohols are dehydrated, the reaction mixtures contain various impurities detrimental to the production of polyesters

(see col. 1 ,lines 23-30). Therefore, it would have been obvious to the skilled artisan in the art to have motivated to incorporate the Feldmann et al crystallization technique into Hartmann in order to further purify the desired product suitable for producing polyesters. This is because the skilled artisan in the art would expect to improve on the purity of the desired compound by applying the Feldmann et al crystallization technique to the Hartmann process.

Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mckane can be reached on 571-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*** [Signature] VJH
4/15/04

[Signature] [Signature]

BA K. TRINH
PRIMARY EXAMINER
GROUP 1200-1625